Relationship Between Mean Platelet Volume and Syncope

Eurasian Clinical and Analytical Medicine Original Research

Syncope and MPV

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Abstract

Aim: Syncope is 1-2% of emergency department incomes and 6% of hospitalizations. Despite the fact that all examinations are done, stil 40% of syncope's etiology is unclear. In our study, our aim was to investigate the relationship between the mean platelet volume and the diagnosis of syncope to clearify the approach of syncope in the future.

Material and Method: The survey has been conducted and the data were collected retrospectively between October 1, 2011 and June 30, 2012 within the 591 syncope patients and 523 trauma patients as control group. Demographics and clinics data of Syncope and control groups were compared. P<0.05 value was accepted statistically significant.

Results: When syncope and control groups were compared, mean platelet volume values were significantly higher in syncope group (p<0.05). Platelet and hematocrit values were not significantly difference between the patients and control group (p>0.05).

Discussion: MPV is a parameter for the diagnosis of syncope.

Keywords

Syncope; Emergency; MPV

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Introduction

Syncope is a transient loss of consciousness (TLOC) with rapid onset, short duration, and full recovery, which is secondary to transient global cerebral hypoperfusion causing a short-lived impairment of the perfusion of the reticular activating system located in brain stem [1,2]. Syncope affects 3% of all men and 3-5% of all women during their lifetime although some studies have suggested an incidence as high as 6% in the elderly [1].

Previous studies have demonstrated that one fourth of the population experiences a syncope attack anytime during their lives [3,4]. Syncope constitutes 1-2% ofall emergency department admissions and 6% of all hospitalizations [3,4]. It may have diverse etiological causes. A subgroup analysis of Framingham study including 7814 patients with syncope revealed that 21% of patients had a vasovagal syncope, 10% cardiac syncope, 9% orthostatic syncope, and 37% had syncope of unknown origin [5]. Cardiac syncope is a rare type of syncope that is most important for emergency care because it is associated with increased mortality and morbidity, particularly in the form of cardiac sudden death [6-9]. Since it is an ominous sign for adverse events and increased mortality, patients suspected to have cardiac syncope undergo multiple tests and examinations, especially in emergency departments. Ciftci et al reported that only 40-50% of patients presenting to emergency department with syncope may receive a definite diagnosis [10]. Previous studies have reported that a cause cannot be determined in 40% of syncope cases despite extensive examinations [10-12]. Moreover, limited resources of emergency departments also lead to 50-60% of cases remaining undiagnosed [13-14]. Mean thrombocyte volume (MPV) is routinely measured in complete blood count and it is usually overlooked by clinicians [15]. It has been reported that a significant correlation exists between MPV and thrombocyte functions [15]. MPV has been shown to correlate to diabetes mellitus (DM), myocardial infarction (MI), smoking, cerebrovascular accident (CVA), and renal artery stenosis [16,17].

In this study we aimed to determine the role of MPV in diagnosis of syncope.

Material and Methods

This study was retrospectively conducted in Ankara Numune Training and Research Hospital after its approval bu the local ethics committee. It included 591 patients presenting to emergency department with syncope between 1 October 2011 and 30 June 2012. A total of 523 patient who presented to emergency department after trauma during the same period were enrolled as the control group. The study data were accessed from the hospital automation system. Patients with epilepsy, metabolic disorders including hyperventilation characterized by hypoglycemia, hypoxia, and hypocapnia, intoxication, vertebrobasilar transient ischemic attack, cataplexy, drop attacks, falls, payxhogenic pseudosyncope, and transient ischemic attack of carotid origin were excluded. Study data were analysed using SPSS (Statistical Package for Social Sciences) Windows 13.0 software package. Descriptive statistics (mean±standard deviation) of the clinical picture on admission and MPV were calculated. Datas were expressed as median and interquartile range. The normality of data distribution was tested by the Kolmogorov Smirnov Test. Mann Whitney U test and Kruskall-Wallis test were used for inter- group comparisons. The results were provided with a confiedence interval of 95% and a p value less than 0.05 was conidered statistically significant.

Results

This study included 591 subjects with syncope (Group1) and 523 control subjects (Group 2). The mean age of the subjects was 48.1±20.6 years in Group 1 and 47.8±20.3 years in Group 2. There was no significant difference between the mean ages of the two groups (p>0.05). The syncope group consisted of 287 (48.6%) men and 304 (51.4%) women while the control group contained 197 (37.7%) men and 326 (62.3%) women. Both groups were similar with respect to gender distribution (p>0.05).

Among the subjects presenting to emergency department with syncope, 243 (41.1%) had reflex syncope, 66 (11.2%) had orthostatic syncope, 48 (8.1%) had cardiac syncope, 34 (5.8%) had neurological syncope, and 18 (3%) had syncope due to internal diseases. A cause for syncope cannot be determined in 182 (30.8%) patients.

Among patients presenting to emergency department with syncope the relationship between patient age and outcome was shown on Table 1. According to this table, it was suggested that syncope incidence was higher below the age of 40 and the hospital admission rate significantly increased as the patients got older. Considering that the clinical condition of the hospitalized subjects is more severe than the non-hospitalized ones, one can conclude that increasing age was correlated to a more severe clinical condition. Hence, there was a significant correlation between age and the hospital admission rate among subjects presenting to emergency department with syncope (Table 1) (p<0.05).

Of the subjects presenting to emergency department with syncope, 543 (91.9%) were discharged after emergency department follow-up, 44 (7.5%) were hospitalized, 3 (0.5%) were referred to another institution, and 1 (0.2%) died.

After presenting to emergency department with syncope, 236 (60.1%) subjects underwent computerized brain tomography. Of these subjects 211 (35.7%) had normal scans. Fifteen (2.5%) had ischemia, 1 (0.2%) had parenchymal hematoma, 1 (0.2%) had aneurysm, 1 (0.2%) had contusion, 1 (0.2%) had mass, and 6 (1%) had SAH.

Two hundred and ninety-two (49.4%) subjects were considered to have

Table 1. The correlation between patient age and outcome

	Age-Syncope-Outcome					p
Age	N (%)	Discharge	Admission	Referred		
<40	249 (%42.1)	242 (%97.2)	7 (%2.4)	1 (%0.4)	0	
40-60	164 (%27.7)	149 (%90.9	13 (%7.9)	2 (%1.2)	0	
60-75	104 (%17.6)	91 (%87.5)	13 (%12.5)	0	0	p<0.001
>75	74 (%12.6)	61 (%82.4)	12 (%16.2)	0	1	
	591 (%100)	543 (%91.9)	47 (%7.4)	3 (% 0.5)	1	

Table 2. Comparison of the groups with respect to Htc, Plt, and MPV

	Group 1 (n: 591)	Group 2 (n: 523)	Z	p*
Htc	40.4 (6.7)	40.2 (7.5)	-1.173	0.241
Plt	228.000 (80.00)	233.000 (92.00)	-1.255	0.210
MPV	9.7 (1.7)	9.1 (2.5)	-4.018	0.000

*Mann-Whitney U

Table 3. MPV levels in different syncope types

	N	MPV	p
Neurologic	34	10.1 (2.18)	
Reflex	243	9.7 (1.7)	
Internal Medicine	18	9.9 (2.6)	
Cardiac	48	10.2 (2.9)	p=0.433*
Ortostatic	66	9.9 (2.57)	
Unexplained	182	9.9 (1.7)	
Total	591		

*Kruskall-Wallis test

cardiac syncope and had their troponin levels measured and 10 (1.7%) of them had elevated troponin level.

Median hematocrit level was 40.4 in Group 1 and 40.2 in Group 2 (p>0.05). Median Thrombocyte count was 228.000/µl in Group 1 and 233.000/µl in Group 2 (p>0.05). Median MPV was 9.7fl in Group 1 and 9.1 fl in Group 2 (p<0.05) (Table 2).

The relationship between syncope etiology and MPV was shown on Table 3. There was a no significant difference between different syncope types with respect to MPV (p>0.05) (Table 3).

Discussion

It is known that a quarter of the world population experience at least one syncope attack during their lifetime [1]. Syncope consitutes 1-2% of all emergency department admissions and 6% of all hospitalizations[1]. Baron-Esquivias et al and Guldner et al reported that women constituted %51.6 and 50.4% of the study populations, respectively [18,19]. The gender distribution of our subjects was in accordance with the literature.

Previous studies have shown that syncope may be encountered in any age group and mortality and morbidity rates progressively increase with increasing age [9,17-23]. The mean age of our study population was 48.1±20.6 years. These results are in agreement with the literature. In accordance with the literature, our study showed that the most common syncope type was vasovagal syncope while the least common type was syncope owing to internal diseases [3,5,19,24,26]. Slight differences between our results and others' results may be due to the differences between the developmental level of the study centers and to the inter-societal differences.

Baron-esquivas et al [18] reported that 25% of the subjects presenting with syncope were admitted to various clinics. Ayrik et al reported that 23.2% of the subjects were hospitalized and 0.64% of them died [25]. Our study resulted in a similar literature.

The reason of studying Hct level in our study was to investigate whether there was a difference between syncope cases due to bleeding into third space and the control group. Fouad-Tarazı et al [27] reported a mean Hct level of 39%.The Hct level found in our study (40.4) was in accordance with the levels reported in the literature; our results also suggested that Hct level had no significant role in determining syncope etiology. However, the patients admitted to internal diseases ward, as compared to other patients, had a significantly lower Hct level. This may be due to hemorrhages, mainly the gastrointestinal ones, that were managed by the department of internal disease.

There are no studies yet that specifically sought for a possible relationship between MPV and syncope although there exist some studies exploring MPV in some etiological factors of syncope. Some studies have reported that MPV increased in coronary artery disease, atherosclerosis, DM, neurological events, and gestational hypertension [28-31]. MPV has been reported to be significantly increased in coronary artery disease, especially in acute coronary syndromes [32]. MPV is even considered an independent risk factor for MI in persons with known coronary artery disease [33]. In stable angina pectoris thrombocyte count remain unchanged but MPV is increased. In unstable angina pectoris, on the other and, thrombocyte count is decreased but MPV is increased. It has been demonstrated that there was a correlation between MPV level and angiographic restenosis [34]. Özdemir et al [35] reported a significantly elevated MPV in anterior MI. It is possible that acute coronary syndromes present with syncope as a result of imparied cardiac perfusion that leads to reduced cardiac output. Syncope may thus be associated with increased MPV level [35]. Kodiatte et al [36] and Turgut et al [37], among others (38,39), reported that MPV levels increased in DM. Diabetes-induced neuropathy may cause syncope through secondary autonomic impairment. In addition, syncope may ensue in patients with DM as a result of direct changes in peripheral resistance due to imparied vessel structure, and coronary artery disease. Therefore, MPV may be increased in syncope. It has been shown that smoker elderly had elevated MPV [39].

Smoking may trigger syncope via cough or GIS stimulation that stimulate vasovagal reflexes. Thus, smoking may be associated with syncope and thus MPV may be increased. Short-term exercise may transiently increase thrombocyte count although MPV remains stable. In prolonged exercise, on the other hand, MPV is decreased [24]. It is well known that exercise can give rise to syncope. Syncope during exertion suggest a cardiac origin while post-exercise syncope is suggestive of reflex (situational) syncope. As a result, syncope may be associated with elevated MPV. Despite a lack of similar studies in the literature, it is well possible that platelets may increase their size to boost their function. Nevertheless, thrombocyte count may remain normal because there may be no new platelets in the peripheral circulation or there may be no sufficient time for new platelet formation. In our study MPV was increased in patients experiencing a syncopal episode. A search of the literature revealed no previous study exploring the relationship between syncope etiology and MPV. Our study found no difference between the various syncope types with regard to MPV. It is evident that brain hypoperfusion is the ultimate endpoint irrespective of the etiology of syncope. It may be speculated that syncope etiology may thus be irrelevant when it comes to MPV elevation.

Conclusions

Syncope is the common endpoint of many different pathologic conditions. Hence, it should be managed in a multidisciplinary manner. MPV should also be evaluated during syncope workup.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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